Check List the journal of biodiversity data

NOTES ON GEOGRAPHIC DISTRIBUTION

Check List 19 (4): 549–553
https://doi.org/10.15560/19.4.549

PENSOFT

Tropidurus chromatops Harvey & Gutberlet, 1998 (Squamata, Tropiduridae): first records from and range extension to the Beni Department, Bolivia

Luis R. Rivas[1*], Gil A. Ojopi[2], Cord B. Eversole[3], Randy L. Powell[4], Gabriel Callapa[5]

1 Centro de Investigación de Recursos Acuáticos (CIRA), Universidad Autónoma del Beni José Ballivián, Trinidad, Beni, Bolivia • luisrivas301280@gmail.com
2 Independent consultant, Bella Vista, Beni, Bolivia • gojopiortiz@gmail.com
3 Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University, Nacogdoches, TX, USA • cord.eversole@students.tamuk.edu
4 Department of Biological and Health Sciences, Texas A&M University-Kingsville, Kingsville, TX, USA • randy.powell@tamuk.edu
5 Bolivian Amphibian Initiative (BAI), Cochabamba, Bolivia • ghab.callapa@gmail.com
* Corresponding author

Abstract. We present the first records of *Tropidurus chromatops* Harvey & Gutberlet, 1998 from the Beni Department (Bolivia) and extend this species' distribution to western Bolivia by approximately 256 km in a straight line to the Beni Floodplains ecoregion. Likewise, we contribute information on some aspects of the natural history, altitude of occurrence, and the geographic distribution of *T. chromatops* in the Department of Beni.

Keywords. Bolivian Precambrian, floodplains, lizard, rock outcrops

Academic editor: Luisa Diele-Viegas
Received 11 May 2023, accepted 2 August 2023, published 11 August 2023

Rivas LR, Ojopi GA, Eversole CB, Powell RL, Callapa G (2023) *Tropidurus chromatops* Harvey & Gutberlet, 1998 (Squamata, Tropiduridae): first record from and range extension to the Beni Department, Bolivia. Check List 19 (4): 549–553. https://doi.org/10.15560/19.4.549

Introduction

At the end of the last century, Harvey and Gutberlet (1998) described three new species of endemic lizards of the genus *Tropidurus*—*Tropidurus callathelys* Harvey & Gutberlet, 1998; *Tropidurus chromatops* Harvey & Gutberlet, 1998; and *Tropidurus xanthochylus* Harvey & Gutberlet, 1998—discovered from near the Bolivian Precambrian formations, currently Serranía de Huanchaca in the Parque Nacional Noel Kempff Mercado (Noel Kempff Mercado National Park) in the Department of Santa Cruz, Bolivia.

In 2014, *T. chromatops* and *T. callathelys* were confirmed in Parque Estadual Serra Ricardo Franco, Mato Grosso, Brazil and the distributions of these species were extended 176 and 89 km east across the Brazilian border, respectively (Morais et al. 2014). The habitat, topography, and biogeography are contiguous in this area, enabling these species to occur in both countries (Litherland and Power 1989; Harvey and Gutberlet 1998; Navarro and Maldonado 2011; Morais et al. 2014).

Tropidurus chromatops is a saxicolous and heliophilous species that occurs in the Serranía de Huanchaca, the Serra Ricardo Franco, and areas surrounding each of these mountain ranges (Harvey and Gutberlet 1998; Morais et al. 2014). Furthermore, this species is sympatric with *T. callathelys* (Harvey and Gutberlet 1998; Carvalho 2013; Morais et al. 2014). *Tropidurus chromatops* differs from *T. callathelys* by a lack of a vertebral crest and tufts of neck spines (present in *T. callathelys*), seven preauricular spines (2–5 in *T. callathelys*), and facial coloration pattern complex in males (dark olive-brown with white spots in *T. callathelys*) (Harvey and Gutberlet 1998; Morais et al. 2014). However, Harvey and Gutberlet (1998) and Morais et al. (2014) indicated that *T. callathelys* occurs exclusively in dense rock outcropings, prefers more direct sunlight and vertical surfaces, and is less active than *T. chromatops*.

©The authors. This is an open access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Information on population dynamics, distribution, and natural history of *T. chromatops* is scarce in the literature (Harvey and Gutberlet 1998; Dirksen and De la Riva 1999; Cortez 2009; Carvalho 2013; Morais et al. 2014; Carvalho et al. 2018; Azurduy and Maillard 2022). In this article, we present new occurrence records of *T. chromatops* from the Department of Beni, Bolivia. This information contributes to our understanding the geographic distribution, natural history, and ecology of *T. chromatops* in Bolivia and will be helpful in the creation of conservation measures.

Methods

In June 2007 and February–March 2023, we surveyed the herpetology of the Cerro Oricore (Fig. 1), a rock outcrop on the banks of the San Martin River in the Parque Departamental y Area Natural de Manejo Integrado Iténez (PDyANMI Iténez) in the Department of Beni, Bolivia. This departmental protected area is represented by Amazonian Forest, floodplains of Beni, and influenced by Cerrado in the Precambrian Shield (Navarro and Maldonado 2011).

During daytime and nighttime surveys, we collected five specimens of *Tropidurus chromatops*. All specimens were captured by hand in exposed rock outcrops. Snout–vent lengths (SVL) and tail lengths (TL) were measured for all captured individuals, and weights in grams were obtained using an Ohaus model HH 320 electronic balance after euthanasia of the specimens. For morphometric data (i.e. number of head and body scales, lamellae on fourth toe, mite pockets, femoral pores, and others structures) we used an Olympus SZX10 DF PL 0.5X stereomicroscope. We also determined sex and photographed each individual following the methodology outlined by Eversole et al. (2019).

All collected specimens were deposited in the herpetological collections of the Museo de Historia Natural Alcide d'Orbigny (MHNCR), Cochabamba and the Centro de Investigación de Recursos Acuáticos (CIRAH), Beni, Bolivia. Specimens were identified as *T. chromatops* by comparison with the original description of the species (Harvey and Gutberlet 1998) and additional sources of information (Harvey and Gutberlet 2000; Frost et al. 2001; Morais et al. 2014). We follow the scutellation and terminology by Frost (1992) and Harvey and Gutberlet (1998).

Geographic coordinates of collected specimens were obtained in decimal degrees (WGS84 datum) using a Garmin etrex GPS receiver. A map was prepared using ArcGIS software (ArcMap 10.1) and including our new records of *T. chromatops* and those reported by Harvey and Gutberlet (1998), Morais et al. (2014), and Azurduy and Maillard (2022).

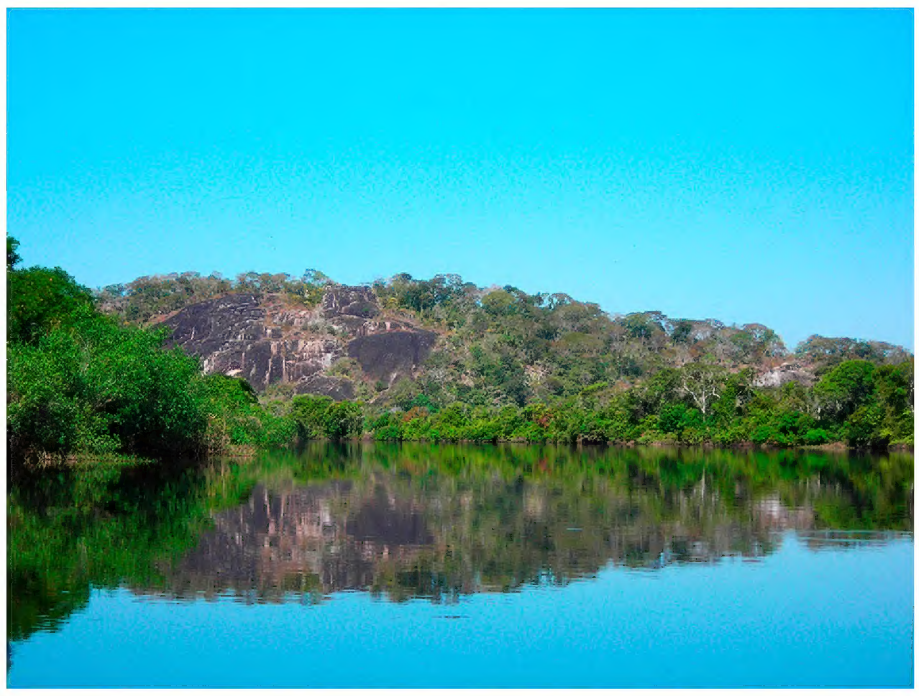

Figure 1. Landscape of Cerro Oricore (rock outcrops), Parque Departamental y Área Natural de Manejo Integrado Iténez, Beni, Bolivia.

Results

***Tropidurus chromatops* Harvey & Gutberlet, 1998**
Figures 2, 3

New records. BOLIVIA – **Beni** • Iténez province, Magdalena municipality, PDyANMI Iténez, Bella Vista community, Cerro Oricore on banks of San Martin River, ca. 160–245 m elev. (Fig. 2); –13.3290, –063.5077; 02.VII.2007; L.R. Rivas & L. Siles leg.; 15:42h, 1♂, in rock outcrop, MHNCR 230 (Fig. 3A) • same locality and date; 15:02h, 1♀, in rock outcrop, MHNCR 231 • same locality; –13.3320, –063.5100; 28.II.2023; L.R. Rivas & G.A. Ojopi leg.; 19:16h, 1♀, in rock outcrops, CIRAH-1009 (Fig. 3B) • same locality; 01.III.2023; L.R. Rivas & G.A. Ojopi leg.; 20:18h, 1♀, in rock outcrop, CIRAH-1010 • same locality and date; 20:25h, 1♀, in rock outcrop, CIRAH-1011.

Identification. The coloration, pattern, morphometric, and meristic data of the specimens (Table 1) are congruent with the descriptions by Harvey and Gutberlet (1998, 2000) as well as others (Frost et al. 2001; Morais et al. 2014; Carvalho et al. 2018).

All specimens of *T. chromatops* studied had the following combination of morphological characters: a) vertebral crest and tufts of neck spines absent (vs. vertebral crest and tufts of neck spines present in *T. callathelys*); b) preauricular fringe complete, consisting of a row of seven spines, and ear canal deep in adults (vs. preauricular fringe with granular scales and a lower cluster of 2–5 spines in *T. callathelys*); c) tail longer than combined length of head and body, cylindrical, and not armed with heavy mucrons (vs. tail longer than the head + body in *T. callathelys*); d) two deep, subequal mite pockets medial to oblique neck fold (vs. pair of deep, ventrolateral mite pockets medial to antegular fold in *T. callathelys*); e) 0–1 patches of granular scales behind axilla, not forming a pocket (vs. axillary granular pocket absent in *T. callathelys*); f) 25–29 subdigital lamellae under the fourth toe (vs. 27–32 subdigital lamellae in *T. callathelys*); g) complex facial color pattern in males, back without large yellow spots (vs. dark olive-brown with white spots in *T. callathelys*); h) midventral patch of black granular scales in males (vs. absent in *T. callathelys*). Additionally, the

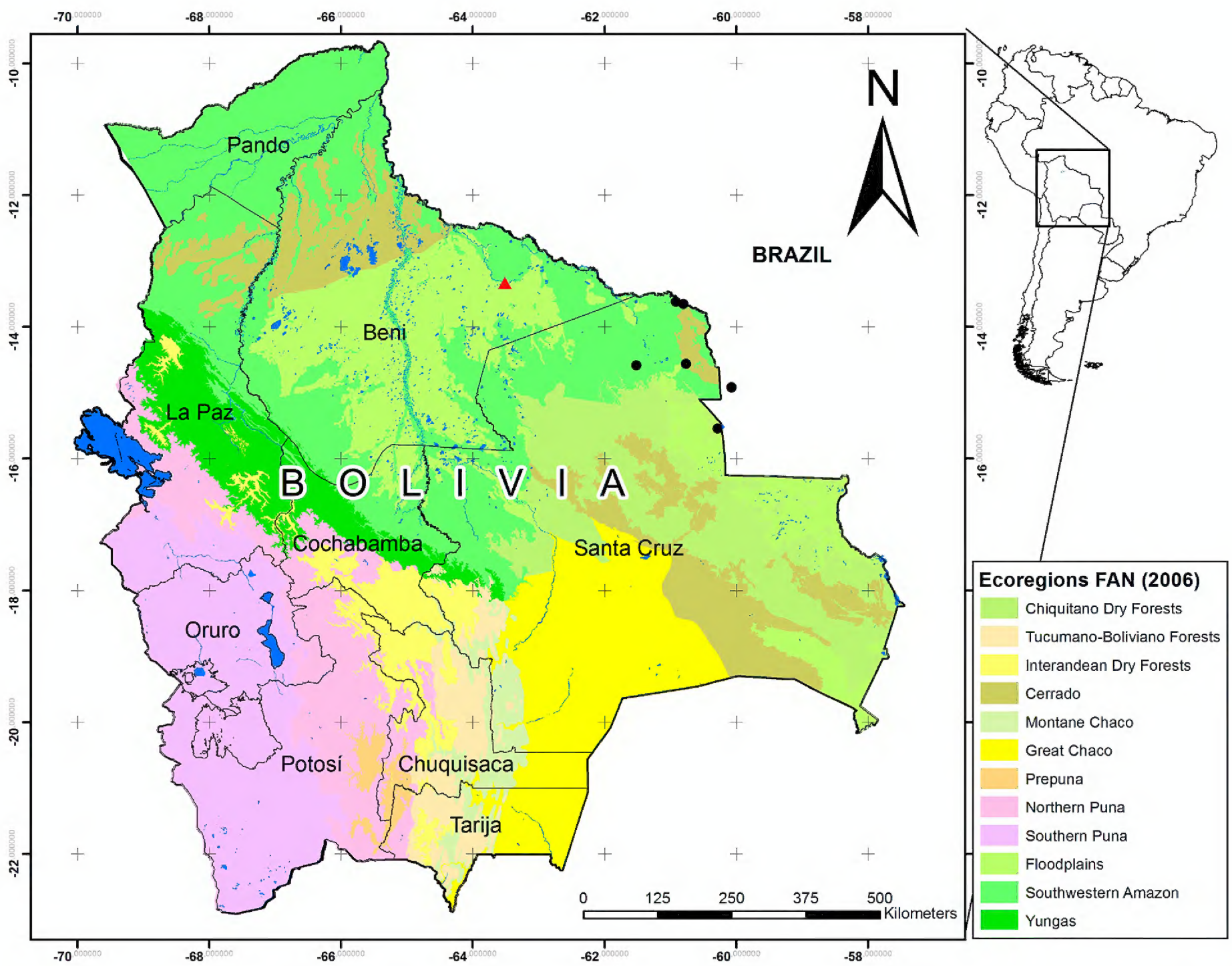

Figure 2. Previous records and range of distribution of *T. chromatops* in Bolivia and Brazil (black points) and new records in the Department of Beni, Bolivia (red triangle).

first postmental contacts the first infralabial, supralabials, and enlarged infralabials (Harvey and Gutberlet 1998, 2000). The SVL of the male (MHNCR 230) measures 98.6 mm, and the four females (MHNCR 231, CIRAH-1009-1011) measure 78–90 mm (Table 1); these SVL values are slightly greater than the range given by Harvey and Gutberlet (1998) in their description of *T. chromatops*.

The color pattern in life is similar to that described by Harvey and Gutberlet (1998); however, individuals from Cerro Oricore exhibit mostly marked shades of blue in the lateral regions of the head and body, on the extremities, and on the tail, especially in males (Fig. 3A).

Discussion

Tropidurus chromatops is known to be elusive and often seeks out rock crevices, thorny bushes, and adjacent trees (Harvey and Gutberlet 1998). Additionally, this species is known to occur in areas with frequent exposure to sunlight, and it is active during most of the daylight hours (Harvey and Gutberlet 1998). The diet of *T. chromatops* consists of a variety of insects but primarily is comprised of ants (Harvey and Gutberlet 1998). The specimens observed in Cerro Oricore exhibited similar behavior to what Harvey and Gutberlet (1998) and Morais et al. (2014) described; however, we observed that their feeding activity, on mainly flying insects,

Table 1. Morphometric and meristic characters of *Tropidurus chromatops* specimens from Beni, Bolivia. SVL: snout–vent length; TL: tail length.

Museum voucher	Sex	SVL (mm)	TL (mm)	Weight (g)	Dorsals	Ventrals	Subdigital lamellae under the fourth toe	Supralabials	Infralabials
CIRAH-1009	Female	90	114	20.9	99	78	29/29	5/6	6/5
CIRAH-1010	Female	88	105	18.2	98	86	26/28	6/6	5/5
CIRAH-1011	Female	78	83	13.4	91	81	28/28	6/6	6/6
MHNCR 230	Male	98.6	110	—	87	77	27/28	6/5	5/6
MHNCR 231	Female	82	119	—	86	76	26/26	6/6	6/6

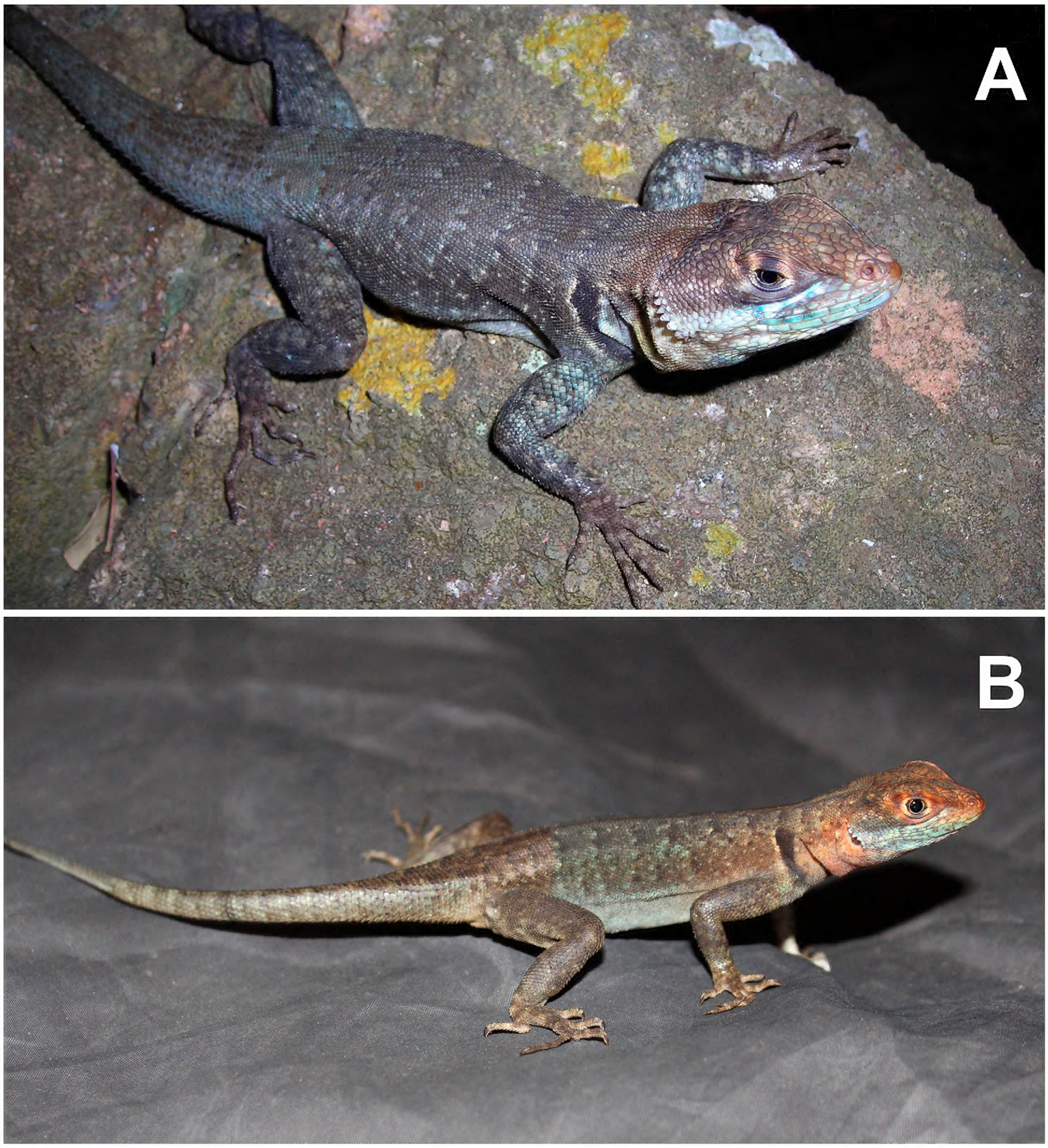

Figure 3. *Tropidurus chromatops* from Cerro Oricore, Parque Departamental y Área Natural de Manejo Integrado Iténez, Beni, Bolivia. **A.** Adult male. **B.** Adult female.

extends past sunset (19:05 h maximum). This information strengthens the knowledge of the behavior and natural history of this scarcely studied species.

Tropidurus chromatops inhabits a complex mosaic of Cerrado vegetation and savannas with patches of isolated forests and scattered streams in the Serranía de Huanchaca and Serra Ricardo Franco in the Bolivian and Brazilian Cerrado, respectively. It also inhabits Chiquitano forest in both Bolivia and Brazil, but there it is closely associated with rocky outcrops (Harvey and Gutberlet 1998; Carvalho 2013; Morais et al. 2014; Azurduy and Maillard 2022) (Fig. 2). Although *T. chromatops* is known to occur along an altitudinal gradient of 300–500 m in the Serrania de Huanchaca, Bolivia and between 630–660 m in the Serra Ricardo Franco, Brazil (Harvey and Gutberlet 1998; Morais et al. 2014), we found this species at lower altitudes between 160 and 245 m in Cerro Oricore, Bolivia (Fig. 1). It is possible that these lower altitudinal records are at lower limit of the altitudinal gradient of the rock outcrops where *T. chromatops* is known to occur.

Brazilian populations of *T. chromatops* are more fragmented than Bolivian populations, possibly as a result of agricultural practices and timber extraction (Morais et al. 2014; IUCN 2023), and Bolivian populations may more stable because of their location Parque Nacional Noel Kempff Mercado, a large protected area (Harvey and Gutberlet 1998). It is possible that *T. chromatops*

may have a broader distribution than currently known, but its populations are likely to be naturally isolated in the complex and heterogeneous landscape of the Cerrado (Morais et al. 2014; IUCN 2023), and the presence of *T. chromatops* in the Cerro Oricore (PDyANMI Iténez) in the Beni Floodplains biogeographic region supports this.

Our new records of *T. chromatops* constitute the first from the Department of Beni and extend the geographic distribution of this species into the Beni Floodplains. The new records are approximately 256 km in a straight line from the nearest previously known record in Bajo Paragua Forest Reserve, Santa Cruz, Bolivia (Harvey and Gutberlet 1998; Fig. 2). Ten et al. (2001) and Quintana and Padial (2003) also reported *Tropidurus* from the Reserva Inmovilizada Iténez in the Department of Beni; however, the species was not reported, but it is probable that this was *T. chromatops*, as suggested by Langstroth (2005).

Acknowledgements

We thank the Secretaria de Medio Ambiente y Recursos Naturales del Gobierno Autónomo Departamental el Beni land the World Wildlife Fund, for the authorization and assistance in this activity. Additionally, we thank Oliver Quinteros and Adriana Aguila for information on the specimens deposited in the Museo de Historia Natural Alcide d'Orbigny, Cochabamba, Bolivia. We also thank the Dirección General de Biodiversidad y Áreas Protegidas for research permits and collection no. 0120/2022. LRR thanks Lizette Siles for involvement in the Bolivian Bats Project and Yesenia Roca for help in establishing contacts in the Bella Vista community.

Author Contributions

Data curation: LRR, GAO, GC. Visualization: LRR. Writing – original draft: LRR. Writing – review and editing: CBE, RLP, LRR.

References

Azurduy H, Maillard O (2022) Islas de roca granítica en la región Chiquitana: sitios de importancia para la conservación en Bolivia. Ecología en Bolivia 57: 39–50.

Carvalho ALG (2013) On the distribution and conservation of the South American lizard genus *Tropidurus* Wied-Neuwied, 1825 (Squamata: Tropiduridae). Zootaxa 3640 (1): 42–56. https://doi.org/10.11646/zootaxa.3640.1.3

Carvalho ALG, Rivas LR, Céspedes R, Rodrigues MT (2018) A new collared lizard (*Tropidurus*: Tropiduridae) endemic to the western Bolivian Andes and its implications for seasonally dry tropical forests. American Museum Novitates 38: 1–54. https://doi.org/10.1206/3896.1

Cortez C (2009) Reptiles. In: Aguirre LF, Aguayo R, Balderrama JA, Cortez C, Tarifa T, Rocha O (Eds.) Libro Rojo de la fauna silvestre de vertebrados de Bolivia. Ministerio de Medio Ambiente y Agua Press, La Paz, Bolivia, 225–236.

Dirksen L, De la Riva I (1999) The lizards and amphisbaenians of Bolivia (Reptilia, Squamata): checklist, localities, and bibliography. Graellsia 55: 199–215. https://doi.org/10.3989/graellsia.1999.v55.i0.329

Eversole CB, Powell RL, Lizarro D, Moreno F, Calderón Vaca G, Aparicio J, Crocker AV (2019) Introduction of a novel natural history collection: a model for global scientific collaboration and enhancement of biodiversity infrastructure with a focus on developing countries. Biodiversity and Conservation 28: 1921–1931. https://doi.org/10.1007/s10531-019-01765-0

Frost DR (1992) Phylogenetic analysis and taxonomy of the *Tropidurus* group of lizards (Iguania: Tropiduridae). American Museum Novitates 3033: 1–64.

Frost DR, Rodrigues MT, Grant T, Titus TA (2001) Phylogenetics of the lizard genus *Tropidurus* (Squamata: Tropiduridae: Tropidurinae): direct optimization, descriptive efficiency, and sensitivity analysis of congruence between molecular data and morphology. Molecular Phylogenetics and Evolution 21 (3): 352–371. https://doi.org/10.1006/mpev.2001.1015

Harvey MB, Gutberlet RL (1998) Lizards of the genus *Tropidurus* (Iguania: Tropiduridae) from the Serranía de Huanchaca, Bolivia: new species, natural history, and a key to the genus. Herpetologica 54 (4): 493–520. https://doi.org/10.2307/3893443

Harvey MB, Gutberlet RL (2000) A phylogenetic analysis of the tropidurine lizards (Squamata: Tropiduridae), including new characters of squamation and epidermal microstructure. Zoological Journal of the Linnean Society 128: 189–233. https://doi.org/10.1111/j.1096-3642.2000.tb00161.x

IUCN (2023) *Tropidurus chromatops*. The IUCN Red List of Threatened Species 2019: e.T178351A56257328. https://doi.org/10.2305/iucn.uk.2019-2.rlts.t178351a56257328.en

Langstroth RP (2005) Adiciones probables y confirmadas para la saurofauna boliviana. Kempffiana 1: 101–128.

Litherland M, Power G (1989) The geologic and geomorphologic evolution of Serranía Huanchaca, eastern Bolivia: the legendary "Lost World". Journal of South American Earth Sciences 2 (1): 1–17. https://doi.org/10.1016/0895-9811(89)90023-0

Morais CJS, Barreto-Lima AF, Dantas PT, Domingos FMCB, Ledo RMD, Pantoja DL, Sousa HC, Colli GR (2014) First records of *Tropidurus callathelys* and *T. chromatops* (Reptilia: Squamata: Tropiduridae) in Brazil. Check List 10 (5): 1213–1217. https://doi.org/10.15560/10.5.1213

Navarro G, Maldonado M (2011) Geografía ecológica de Bolivia: vegetación y ambientes acuáticos. Centro de Ecología Difusión Simón I. Patiño, Santa Cruz de la Sierra, Bolivia, 719 pp.

Quintana AZ, Padial JM (2003) Herpetofauna de la Reserva Iténez (Bolivia). Revista Boliviana de Ecología y Conservación Ambiental 14: 97–103.

Ten S, Liceaga I, Gonzáles M, Jiménez J, Torres L, Vázquez R, Heredia J, Padial JM (2001) Reserva Inmovilizada Iténez: primer listado de vertebrados. Revista Boliviana de Ecología y Conservación Ambiental 10: 81–110.